



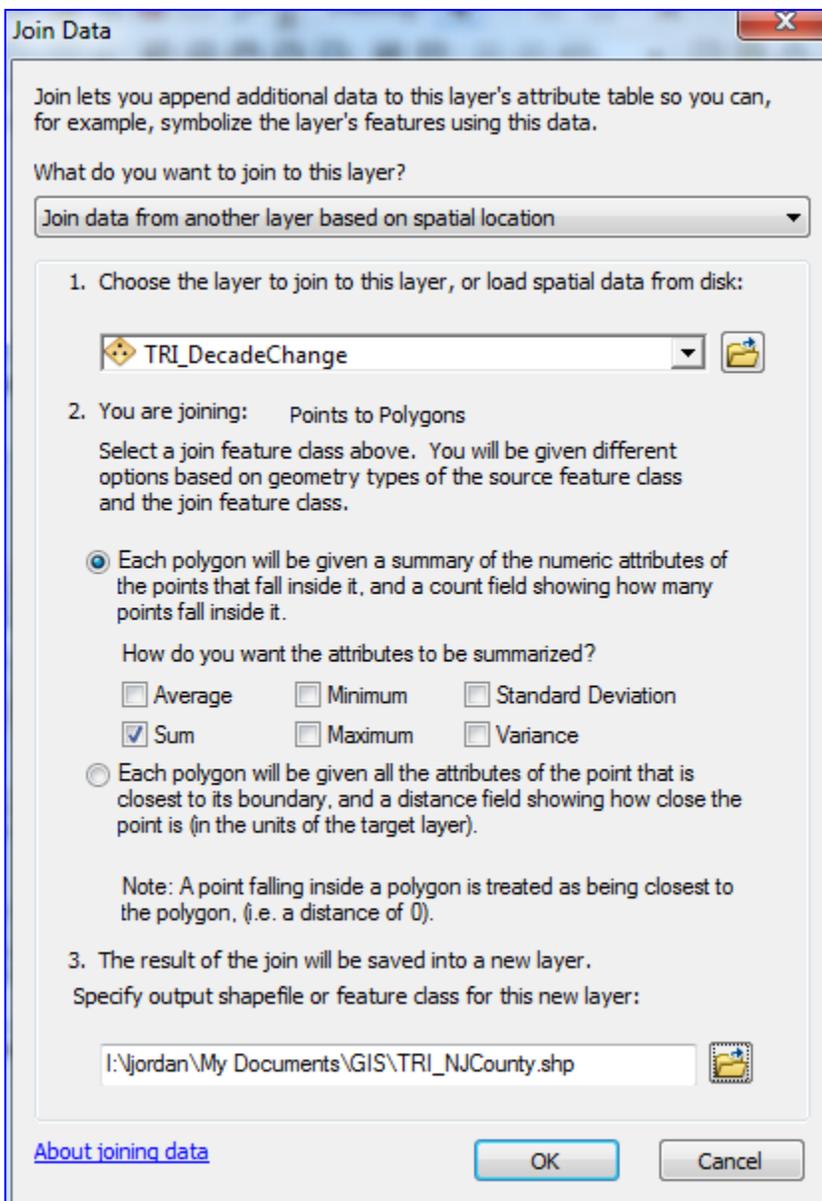
Tutorial 4 – Part 2 – Spatial Joins

This tutorial picks up where Tutorial 4 left off and will introduce you to the following:

- Spatial Joins - Summarizing and Generalizing Point Data
- Influencing Visual Presentation of Data Using Different Classification Schemes
- Trying It on Your Own!

Part 1. Spatial Joins

In previous work, we have created attribute joins, which join two tables based on a unique identifier, or common field. Spatial joins combine information based on their relative location. A common use for spatial joins is to summarize information at a different scale. For example, we have data on TRI releases between 2000 and 2010 for point locations in New Jersey. It might be useful to know the total change in emission for each county as a whole. A spatial join will help us find this information.



To create a spatial join between TRI facilities that have changed in the last decade and New Jersey counties, right-click on the New Jersey county boundaries in the table of contents, and select Joins and Relates > Joins.

Instead of the default option, which would be to join based on attribute, choose instead to **Join data from another layer based on spatial location**.

The layer to join to counties will be the TRI layer that selects data where releases have been greater than zero for facilities in 2000 and 2010.

For generalizing the information, choose to sum the data. This way for each field the value will now be the total for all records contained in each county. For example, the total change column will be the summation of all change for all the facilities in each county.

Save the information to a location and a name that you can remember, and make sure it's saved as a shapefile. Then, click OK.



Part 2. Using Different Classification Schemes

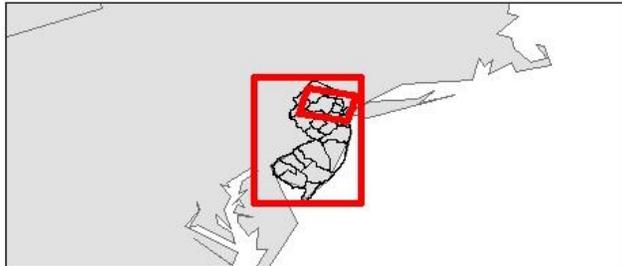
Now you can study the changes in toxic releases in New Jersey for each county. To do this, double click on the new spatial join layer that you created. Mine was named TRI_NJCounty. As in previous tutorials, click the Symbology tab, and show Quantities > Graduated Colors. The value should be the sum of total change. Instead of using the default Jenks Natural Breaks, click the Classify button, and change the drop down menu for method to try a different scheme. Both the scheme and color can make a big difference on how your audience interprets your map.

The screenshot shows the Layer Properties dialog box for the TRI_NJCounty layer, with the Symbology tab selected. The 'Quantities' classification scheme is chosen, and the 'Sum_TOT_CH' field is selected. The 'Standard Deviation' classification method is used with 6 classes. A color ramp is shown, and a table of class ranges and labels is displayed.

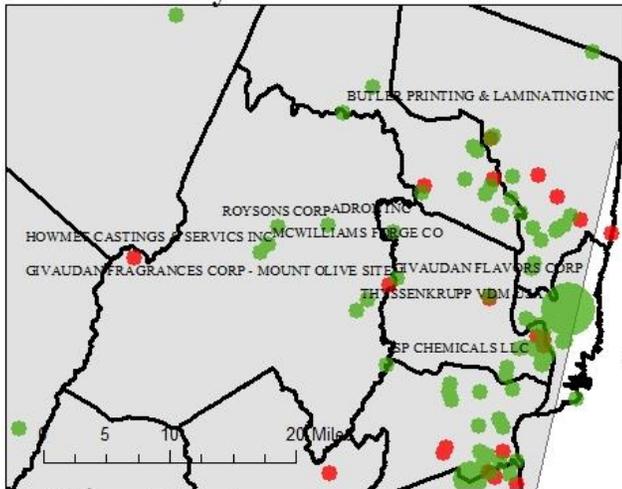
Symbol	Range	Label
	-3149663.000000 - -2299506.715393	< -2.5 Std. Dev.
	-2299506.715392 - -1460156.619712	-2.5 - -1.5 Std. Dev.
	-1460156.619711 - -620806.524031	-1.5 - -0.50 Std. Dev.
	-620806.524030 - 218543.571650	-0.50 - 0.50 Std. Dev.
	218543.571651 - 1057893.667331	0.50 - 1.5 Std. Dev.
	1057893.667332 - 1828972.000000	1.5 - 2.4 Std. Dev.



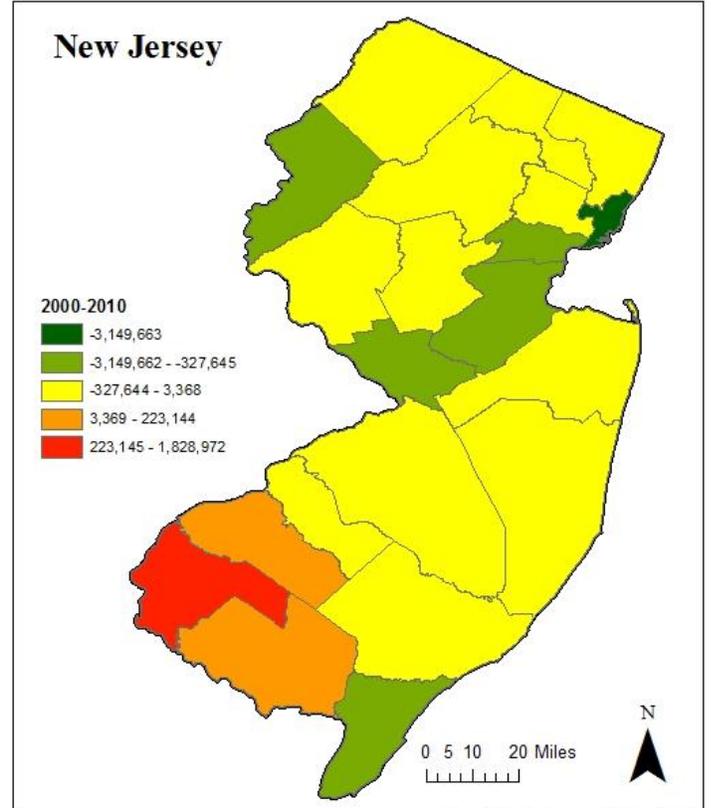
Toxic Release Inventory (TRI) Facilities in New Jersey and Morris County: Change in Lbs. of Toxic Release, 2000-2010



Morris County



Data: NJ Geospatial Network
 TRI - EPA Database



One of the most wonderful things about map analysis is that it can really expand on simple statistical summaries. Way above, on page 7 of Tutorial 4, the statistical summary showed that, on average, toxic releases have declined in the state of New Jersey. This is true. However, by mapping this information, it becomes obvious that emissions didn't decline uniformly. Rather, there appears to be almost a north-south trend, where northern counties experienced a decline and southern counties may have even experienced an increase. Another map might take into account total emissions, to show where the highest releases in the state are overall.

Part 3. Create Your Own Analysis!

The last step is to try out some of these techniques for yourself. Perhaps you would like to compare different years: 2010 and 2011, or 2011 to 1988. Perhaps you would like to look at a different state. In your analysis, I would like to see one data frame (map) with points, and one data frame (map) with counties, where the counties are illustrated using a thematic or choropleth map (like the one above). Add a title and at least one legend. Have fun! When you're done, save your map as a .jpg, and share it with others.